

Predeployment Gender Differences in Stressors and Mental Health Among U.S. National Guard Troops Poised for Operation Iraqi Freedom Deployment

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Increased exposure of women soldiers to combat in current conflicts heightens interest in the question of whether risk and resilience factors differ for female and male military personnel prior to deployment. The authors examined this question in a panel of 522 National Guard soldiers (462 men and 60 women) poised for deployment to Iraq. Soldiers completed a battery of self-report measures, including the PTSD Checklist, Beck Depression Inventory-II, and scales from the Deployment Risk and Resilience Inventory. Modest differences were observed between women and men on predeployment risk factors and some risk-related correlations with PTSD and depression measures; however, gender did not moderate the associations between hypothesized risk/resilience factors and baseline mental health. Implications for interventions and future research are discussed.

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Although women have taken up arms and participated in every major U.S. conflict since the Revolutionary War (Murdoch et al., 2006), female soldiers' ever-increasing military representation and the progressively blurred distinction between combat and noncombat roles has led to historically unprecedented combat exposures and casualties among women deployed to the current conflicts in Iraq (Operation Iraqi Freedom; OIF) and Afghanistan (Operation Enduring Freedom; OEF). Despite the increasing number of women in the military, little is known about gender differences in military personnel before deploying to a combat zone. The goal of the current study is to address this gap in the literature.

Evidence concerning risk factors for posttraumatic stress disorder (PTSD; Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003) indicates the importance of not only war zone factors (e.g., severity of combat exposure), but also predeployment (e.g., childhood environment, prior stressors, prior psychopathology) and postdeployment (e.g., subsequent life stressors and social support) factors (King, King, Fairbank, Keane, & Adams, 1998; King, King, Foy, & Gudanowski, 1996; Vogt & Tanner, 2007). Within this overall framework, male and female soldiers are likely to bring distinctly gendered historical risk factors that may influence their predeployment mental health functioning. For example, although military personnel generally report high rates of trauma exposure prior to deployment, female soldiers are more likely to have a history of sexual trauma, and male soldiers are more likely to have a history of nonsexual traumas (Stretch, Knudson, & Durand, 1998). This distinction is important because sexual violence is associated with the highest conditional risk of PTSD (Breslau, Chilcoat, Kessler, & Davis, 1999). In addition, female soldiers have reported poorer childhood family environments characterized by greater childhood abuse compared to male soldiers (Rosen & Martin, 1996), and this risk factor has been found to be a robust predictor of military-related PTSD (King, King, Foy, Keane, & Fairbank, 1999).

Women do not receive formal combat training because they are prohibited from direct combat military occupational specialties (MOS; e.g., infantry). As a result, women may feel less prepared for deployment to a combat zone than men. Similarly, female military personnel are a minority group situated in a male-dominated work environment and past research indicates that perceived lack of deployment social support is a stronger risk factor for depression in women following deployment than men (Vogt, Pless, King, & King, 2005). It is relevant to examine whether unit social support is already a concern while soldiers are poised for deployment as this may uniquely impact women's baseline functioning. Finally, concerns about family and life disruptions back home have been found to have a stronger relationship with women's postdeployment mental health compared to men's (Malone et al., 1996; Ryan-Wenger, 1992; Vogt et al., 2005) and may begin to impact soldiers during mobilization.

An important limitation of previous studies has been their reliance upon retrospective designs. With the exception of Vogt,

Proctor, King, King, and Vasterling (2008) who examined predeployment differences in women's and men's stressor exposure, we are aware of no studies that have examined gender differences in a range of risk and resilience factors prior to troops' deployment. Thus, it is important to examine whether there are baseline gender differences in historical, environmental, and psychological risk factors as troops prepare for deployment.

In the present study, our goals were to examine gender differences in an array of psychosocial risk and resilience factors assessed prior to deployment, identify gender differences in predeployment mental health indicators, and examine whether gender moderates the associations between risk/resilience factors and baseline mental health functioning. We measured PTSD and depression symptoms at predeployment and anticipated that women would report more baseline mental health symptoms than men. We expected the relationships between prior stressor exposure and both PTSD and depression symptoms would be stronger for women than for men. Likewise, we predicted the relationship between environmental risk/resilience factors (e.g., perceptions of military preparedness, perceptions of unit social support, and concerns about life and family disruptions) and mental health symptoms would be stronger for women compared to men.

METHOD

Participants and Procedure

Data were collected from a convenience sample of 522 soldiers from a United States Army National Guard Brigade Combat Team one month prior to troops' deployment to OIF. Based on aggregate administrative data provided by Brigade Combat Team commanders, the current sample represented approximately 20% of the Brigade Combat Team. At the time of data collection in March 2006, soldiers had completed 5 months of intensive mobilization training at Camp Shelby, Mississippi, and were poised for a one-year deployment (Polusny et al., 2009). Over approximately $2\frac{1}{2}$ weeks, soldiers were invited through unit announcements and flyers to attend a group briefing session about the study. Multiple group briefings were held by investigators throughout each day of the recruitment period. The size of each group briefing session varied, but generally involved attendance of about 6 to 20 soldiers. After providing written informed consent, soldiers voluntarily completed a battery of self-report measures in group classrooms under standardized conditions with an investigator present to answer questions. The procedures lasted about 60 minutes. Procedures were approved by the relevant institutional review boards and the National Guard command.

The 522 participants ranged in age from 18 to 57 years ($M = 29.1$, $SD = 8.6$) and included 462 men and 60 women. The sample represented a range of MOSs categorized as combat arms (48%), combat support (16%), and combat service support (36%). Years of education ranged from 9 to 23 years ($M = 14.2$,

$SD = 2.0$). Aggregate administrative data obtained from the command suggested that participants in the current study were broadly representative of all soldiers deployed to Iraq with the brigade, although women were slightly overrepresented in the sample (12% vs. 9%). Ninety percent of the sample (89% of men and 97% of women) versus 89% of the brigade was enlisted personnel. Sixty percent of the sample (58% of men and 78% of women) was between the ages of 18 and 29 years compared to 65% of the brigade. About 45% of the sample (48% of men versus 27% of women) was married compared to 39% of the overall brigade. Finally, 92% of the sample (92% of men and 90% of women) was Caucasian compared to 94% of the brigade.

Measures

The PTSD Checklist-Civilian Version (PCL-C; Weathers, Huska, & Keane, 1991) was used to measure posttraumatic stress symptomatology. This measure consists of 17 items corresponding to the symptom criteria for PTSD. Respondents are asked to rate each item on a scale from 1 = *not at all* to 5 = *extremely* indicating the degree to which they were bothered by the designated symptom within the previous month. The PCL has demonstrated test-retest reliability (Weathers, Litz, Herman, Huska, & Keane, 1993) and high overall convergent validity with other measures of PTSD (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). Internal consistency for this sample was .92.

The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) was used to measure the severity of depressive symptoms. This 21-item measure is widely used in both clinical and nonclinical populations. Respondents are asked to rate on a 4-point scale (0–3) how often they have experienced each item in the past 2 weeks. Total scores range from 0 to 63. The BDI-II has demonstrated adequate reliability and validity (Beck et al., 1996). Internal consistency for this sample was .91.

Selected scales from the Deployment Risk and Resilience Inventory (DRRI; King, King, Vogt, Knight, & Samper, 2006) were used to measure five risk/resilience factors. The DRRI is a collection of 14 scales designed to assess psychosocial risk and resilience factors for military personnel deployed to combat zones. It has demonstrated adequate reliability and validity in both Gulf War (King et al., 2006) and OIF (Vogt, Samper, King, King, & Martin, 2008) military veteran samples. We initially selected the two original predeployment scales, Prior Stressors and Childhood Family Environment. Prior Stressors (number of 17 items endorsed; $\alpha = .73$) assessed exposure to different stressors and potentially traumatic events before deployment (e.g., physical assault, sexual abuse, domestic violence, previous combat duty). In addition to the total score, all 17 items from this scale were examined individually to compare endorsement rates across genders. Childhood Family Environment (sum of 15 items rated on a Likert scale from 1 = *almost none of the time* to 5 = *almost all of the time*; $\alpha = .91$) assessed the extent of cohesion, accord and closeness

among members in the individual's family of origin with higher scores representing positive family environments.

Three additional DRRI scales (Preparedness, Unit Social Support, Concerns about Life, and Family Disruptions) were selected based upon our assumption that these factors are relevant before soldiers deploy to a combat zone. Preparedness (sum of 14 items rated on a Likert scale from 1 = *strongly disagree* to 5 = *strongly agree*; $\alpha = .81$) assessed the extent to which an individual believed, at the time of data collection, that she or he was prepared for the upcoming deployment (e.g., "I have all the supplies and equipment needed to get my job done."). Unit Social Support (sum of 12 items rated on a Likert scale from 1 = *strongly disagree* to 5 = *strongly agree*; $\alpha = .91$) assessed the individual's current beliefs about their relationship with other military personnel (e.g., "The commanding officer(s) in my unit are supportive of my efforts."). Concerns about Life and Family Disruptions (sum of 14 items rated on a Likert scale from 4 = *a great deal* to 1 = *not at all*, with 0 = *not applicable*; $\alpha = .81$) assessed individuals' concerns about how their upcoming deployment might affect important life domains (e.g., "I am concerned about missing important events at home such as birthdays, weddings, funerals, graduations, etc."). Verb tense for these scales was modified to reflect present tense, rather than past tense in the original versions. Preparedness and Unit Social Support explored soldiers' current perceptions at the time of measure administration, whereas Concerns about Life and Family Disruptions asked soldiers to anticipate how deployment would affect their life and family.

Data Analysis

We initially examined potential gender differences in prior life stressors, risk/resilience factors, and mental health symptoms using chi-square or Student's t tests, as appropriate. We used the Fisher r to Z transformation to test for differences (one-tailed) in correlation coefficients between men and women. Dichotomous prior stressor items were used to determine the percentage of men and women that had experienced each stressor type. Effect sizes were reported using Cohen's d following conventions for interpretation (Cohen, 1988, 1992) such that a small effect = .20, medium = .50, and large = .80. We used hierarchical multiple regression to examine the independent associations between gender, hypothesized risk and resilience factors, and both mental health variables. To evaluate the potential moderating effect of gender on any association between our hypothesized predictors and mental health, we centered predictor variables and generated interaction terms between gender and each predictor. Because interactions can sometimes mask main effects, we tested for interactions even when gender was not independently associated with the outcome of interest in the main effects model. We determined the family-wise error rate based on tests of the main effect and interaction terms from the seven multiple regression analyses for each mental health outcome. We applied the Hochberg step-up procedure (Hochberg,

1988) to adjust for multiple tests performed for the family of comparisons listed in Tables 2 through 5, with adjustments conducted separately for each table. In the Hochberg procedure, the p -values for a set of tests are arranged from largest to smallest. The largest value is evaluated at alpha (i.e., .05). If the null hypothesis is not rejected, the next largest value is evaluated at $\alpha/2$ (i.e., .05/2 = .025) and so on until the null hypothesis is rejected (the p -value is less than the adjusted α). At this point, all further p -values lead to rejection of the null hypothesis for the associated tests.

RESULTS

Table 1 shows no significant differences in PTSD symptom severity between women and men, but women endorsed significantly more depression symptoms. Similarly, women (0%) and men (4%) did not differ in terms of positive screens for PTSD based on criteria according to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)*; American Psychiatric Association, 1994, i.e., endorsement of at least one intrusion symptom, three avoidance symptoms, and two hyperarousal symptoms at the moderate level) plus a total PCL score of at least 50 (Hoge et al., 2004), $\chi^2(1, N = 516) = 2.60, p = .107$, but more women than men (13% vs. 5%), $\chi^2(1, N = 514) = 6.95, p = .008$, screened positive for depression based on a BDI-II score of 20 or greater indicating probable depression (Beck et al., 1996).

Women and men did not differ in terms of reported life stressor types, averaging 6.1 and 5.6 respectively, $F(1, 519) = 1.13, ns$. The percentage of women and men endorsing each prior stressor scale item is listed in Table 2. A greater proportion of women than men endorsed having a parent with a substance use disorder, $\chi^2(1, N = 520) = 12.20, p < .001$; history of emotional mistreatment, $\chi^2(1, N = 520) = 10.61, p < .001$; and both childhood and adult sexual assault, $\chi^2(1, N = 510) = 18.59, p < .001$; $\chi^2(1, N = 522) = 109.85, p < .001$, respectively. A greater proportion of men than women endorsed childhood physical assault experiences, $\chi^2(1, N = 522) = 8.50, p < .004$.

On average, women and men scored similarly in ratings of childhood family environments (women, $M = 52.3, SD = 11.0$; men, $M = 53.6, SD = 10.1$), $F(1, 518) = .75, p = .39$, and

Table 2. Frequencies of Prior Life Stressor by Gender

Variable	Men % ($n = 462$)	Women % ($n = 60$)
Parent with substance use disorder	25	47*
Witnessed physical fighting between parents	31	38
Emotional mistreatment	38	60*
Childhood physical assault	55	35*
Childhood sexual assault	6	22*
Physical punishment during childhood	53	42
Adult physical assault	33	30
Adult sexual assault	2	37*
Mental/physical illness of someone close	43	57
Divorce or left by significant other	28	32
Lost job	36	23
Death of someone close	72	77
Witnessed assault or death	32	23
Robbed or home broken into	27	23
Natural disaster	33	37
Exposure to toxic substance	14	13
Combat or war zone exposure	24	10

* $p \leq .05$ (Hochberg adjustment for multiple comparisons).

concerns about life and family disruptions that might take place while they were deployed (women, $M = 28.1, SD = 6.4$; men, $M = 28.9, SD = 7.6$), $F(1, 518) = .62, ns$. However, women scored significantly lower than men on preparedness for deployment (women, $M = 32.5, SD = 7.2$; men, $M = 34.7, SD = 7.4$), $F(1, 519) = 4.79, p < .05$, and perceived unit social support (women, $M = 37.9, SD = 9.7$; men, $M = 41.0, SD = 9.9$), $F(1, 519) = 5.07, p < .05$. Effect sizes were small for preparedness ($d = .19$) and unit support ($d = .20$).

Table 3 presents the correlations among the risk/resilience factors and baseline mental health symptoms, with coefficients for men presented above the diagonal and coefficients for women below. The only significant gender differences in this set of correlations indicated that the measure of concerns about life and family disruptions that may take place back home during deployment was more strongly associated with PTSD ($z = 1.65$), $p < .05$, and depression ($z = 1.95$), $p < .05$, symptoms for women than for men.

Tables 4 and 5 illustrate the results of hierarchical multiple regression analyses conducted to test the potential moderating effect of gender on the associations between risk/resilience factors and self-reported symptoms of PTSD and depression. These show no main effects for gender on PTSD symptoms and no significant interactions involving gender for either PTSD or depression symptoms. Female gender did remain independently associated with depression symptoms even after controlling for other hypothesized risk and resilience factors. Moreover, greater prior stressor

Table 1. Descriptive Statistics and Group Contrasts for Pre-deployment PCL-C and BDI-II Scores

Variable	Men ($n = 460$)		Women ($n = 60$)		$t(df = 1)$	ES
	M	SD	M	SD		
PCL – C	26.0	10.2	27.4	8.4	<1	0.09
BDI – II	5.6	6.7	9.5	7.2	-4.25*	0.38

Note. ES = Effect sizes using Cohen's d . PCL-C = PTSD Checklist – Civilian Version; BDI-II = Beck Depression Inventory-II.

* $p < .05$.

Table 3. Correlations Among Variables by Gender

Variable	PCL-C Total	BDI-II Total	Prior stressors	Childhood environment	Preparedness	Unit support	Family concerns
PCL-C total		.76*	.21*	-.28*	-.24*	-.28*	.26*
BDI-II total	.71*		.16*	-.29*	-.29*	-.40*	.22*
Prior stressors	.13	.07		-.32*	-.07	-.17*	.20*
Childhood environment	-.35	-.17	-.36		.14*	.32*	-.16*
Preparedness	-.12	-.30	-.14	.08		.51*	-.23*
Unit support	-.28	-.49*	-.12	.18	.47*		-.27*
Family concerns	.46*	.46*	.24	-.25	-.28	-.05	

Note. Correlations for male soldiers are presented above the diagonal, and correlations for female soldiers are presented below the diagonal. PCL-C = PTSD Checklist – Civilian Version; BDI-II = Beck Depression Inventory-II; Childhood environment = childhood family environment; Family concerns = concern about life/family disruptions.

* $p < .05$ (Hochberg adjustment for multiple comparisons).

exposure, poorer childhood family environment, perceptions of poorer preparedness, lower levels of unit social support, and greater concerns about how deployment may disrupt life and family were independently associated with PTSD and depression symptoms prior to deployment. History of childhood physical assault was independently associated with depression symptoms only.

DISCUSSION

Our findings indicate that this cohort of male and female National Guard troops had low rates of mental health symptoms after completing 5 months of intensive training and anticipating deployment to Iraq in one month. Although women and men were similar in terms of the number of different lifetime stressors experienced prior to deployment and their ratings of childhood family environments (e.g., cohesion, accord and closeness among family members), women were more likely to report having a parent with a substance use disorder, a history of emotional mistreatment, and a history of sexual assault. Men more frequently reported childhood physical assault. Despite prior exposure to life stressors, none of the women and few men met strict screening criteria for PTSD.

Although no gender differences were observed for posttraumatic stress symptoms, as expected, women reported greater depression symptoms prior to deployment than men. In addition, women screened positive for moderate or greater depression at 13%, more than twice the 5% rate for men. Although not directly comparable, these rates are similar to national prevalence rates of depression observed in the general population, which indicate approximately 9% of women and 5% of men carry a current diagnosis of major depressive disorder (Kessler, Chiu, Demler, Merikangas, & Walters, 2005). Additionally, women reported feeling less prepared and perceived less unit social support compared to men. Overall, the magnitude of gender differences observed were modest, suggesting that male and female troops are relatively similar to each other with respect to psychosocial risk and resilience factors

reported one month prior to deployment. This outcome is consistent with Vogt, Proctor, et al.'s (2008) postdeployment gender comparisons and extends these findings by providing comparable information about male and female troops' functioning prior to deployment.

Contrary to our hypotheses, gender did not moderate the relationship between risk and resilience factors and baseline mental health. Based on our overall sample size of approximately 500, but taking into account the increased standard error in measurement for the smaller subsample of women ($n = 60$), we estimate 80% power to find a significant interaction with partial correlation effect of about .10 using an alpha of .05. This corresponds to an increase in R^2 of 1% over the variance explained by the main effects. By convention, this is considered a small effect and, thus, it seems unlikely that type II errors account for our failure to reject the null hypothesis. The available statistical power supports the relative absence of baseline differences between the men and women in our sample.

Although gender did not emerge as a moderator of the relation between risk and resilience factors and panel members' baseline mental health, gender-specific bivariate correlations highlighted one factor that men and women differed on. Concerns about life and family functioning during deployment were more strongly related to PTSD and depression symptoms for women compared to men. If replicated, these findings may have implications for the development of prevention strategies such as implementing family interventions to help military personnel manage worries before deployment.

The current study has several limitations. Data were cross-sectional and based on self-report. The panel of National Guard soldiers examined was a convenience sample of mostly male, Caucasian soldiers. Although demographic characteristics of our panel were broadly comparable to the population from which they were sampled, we do not know whether those who participated and those who did not were different on other variables that may have

Table 4. Summary of Multiple Regression Analyses for Prior Stressor Exposures Predicting Mental Health Symptoms

Prior stressor exposure	PTSD symptoms		Depression symptoms	
	β	Adjusted R^2	β	Adjusted R^2
Number of prior stressor exposures				
Step 1		.04		.05
Gender	.03		.18**	
Prior stressor	.20**		.15**	
Step 2		.04		.05
Gender	.04		.18**	
Number of prior stressors	.22**		.16**	
Gender \times number of prior stressors	-.05		-.04	
Childhood family environment				
Step 1		.08		.10
Gender	.03		.17**	
Childhood family environment	-.29**		-.27**	
Step 2		.08		.10
Gender	.03		.18**	
Childhood family environment	-.29**		-.29**	
Gender \times childhood family environment	.01		.05	
Childhood physical assault				
Step 1		.00		.04
Gender	.05		.20**	
Childhood physical assault	.05		.11**	
Step 2		-.001		.05
Gender	.06		.27**	
Childhood physical assault	.06		.14**	
Gender \times childhood physical assault	-.02		-.11	
Childhood sexual assault				
Step 1		.00		.03
Gender	.03		.18**	
Childhood sexual assault	.05		.01	
Step 2		-.001		.03
Gender	.03		.20**	
Childhood sexual assault	.06		.04	
Gender \times childhood sexual assault	.00		-.05	

** $p < .001$.

influenced findings. Therefore, findings should be generalized with caution, and future studies should consider oversampling women to increase power for gender comparisons. Our sample also was constrained to National Guard troops, which extends the literature, but also potentially limits the ability to generalize findings to other military branches.

This study extends existing literature by identifying several associations that were evident at the time our panel was poised for OIF deployment. Having experienced more lifetime stressors, feeling less prepared for deployment, perceiving a lack of unit support, and

feeling concerned about how deployment might negatively impact one's life and family were all associated with poorer predeployment mental health. Conversely, quality of childhood family environment was negatively associated with mental health symptom indicators prior to deployment. Compared with previous research, this study provides a more extensive analysis of gender differences in risk and resilience factors among soldiers poised for deployment to a combat zone. Current data provide a foundation for examining gender differences in mental health that may emerge following deployment.

Table 5. Summary of Multiple Regression Analyses for Environmental Risk/Resilience Factors Predicting Mental Health Symptoms

Risk/resilience factor	PTSD symptoms		Depression symptoms	
	β	Adjusted R^2	β	Adjusted R^2
Deployment preparedness				
Step 1		.05		.11
Gender	.02		.16**	
Preparedness	-.23**		-.28**	
Step 2		.05		.11
Gender	.03		.16**	
Preparedness	-.24**		-.28**	
Gender \times preparedness	.05		-.01	
Unit social support				
Step 1		.08		.19
Gender	.02		.15**	
Unit social support	-.28**		-.40**	
Step 2		.07		.19
Gender	.02		.13**	
Unit social support	-.28**		-.39**	
Gender \times unit social support	.01		-.05	
Concerns about life and family disruptions				
Step 1		.07		.09
Gender	.05		.19**	
Life/family disruptions	.27**		.24**	
Step 2		.07		.10
Gender	.06		.20**	
Life/family disruptions	.26**		.21**	
Gender \times life/family disruptions	.06		.10	

** $p < .001$.

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